The size of the animalcule is about the1-5th of a line in diameter. It appears to be permanently fixed to the positions in which it is found. When disturbed, it folds up its oral cup like an umbrella and retracts it within the body. By means of it, it catches its prey, which consists of smaller animalcules. From the stomach of one individual I squeezed out as many as fifty of the latter.

For the genus and species the name *Dictyophora vorax* is proposed.

December 15*th*, 1857.

Vice-President BRIDGES in the Chair.

A paper was presented for publication in the Proceedings, entitled "Prodromus Descriptionis Animalium Invertebratorum quæ in Expeditione ad Oceanum Pacificum Septentrionalem a Republicâ Federatâ missâ, Cadwalladero Ringgold et Johanne Rodgers ducibus, observavit et descripsit W. Stimpson, Pars Tertia," which was referred to a Committee.

Mr. Lea exhibited the plates accompanying his paper, recently presented to the Academy, on fresh water Naïades collected in Siam, &c., by Dr. House, at the suggestion of Mr. Haines and others of New York. Several of the specimens are very similar to our own species from the valley of the Ohio. A specimen from Australia much resembles the U. Hopetonensis, Lea, from Southern Georgia.

December 22*d*, 1857.

Vice President BRIDGES in the Chair.

A paper was presented for publication in the Proceedings, entitled "Observations on a Group of Fossil Shells found in Tippah Co., Miss., with descriptions of fifty-five new species," by T. A. Conrad, which was referred to a Committee.

Mr. Lea stated, in presenting a specimen to the Academy, that he had visited the locality at Braintree, 10 miles south of Boston, where specimens of large *Trilobites* have been recently found. The attention of Prof. W. B. Rogers was called, some fifteen months since, to "this unique and most interesting locality," by Peter Wainwright, Esq., residing in the neighborhood. Mr. Lea agreed entirely with Prof. Rogers in placing this formation among the more ancient of the Paleozoic periods. It lies directly on the granite rocks, or rather it is squeezed in and is embraced by these rocks, (on the east and west sides,) which are disturbed by an upheaval. The formation here is about three hundred yards wide, and lies in a south-east direction. In examination of the quarry, Mr. Lea was kindly assisted by the owner, Mr. E. Hayward, who now carefully preserves the best specimens which are brought to light. He pointed out to Mr. Lea the parts of the quarry where most of the specimens were found, and where some impressions were still remaining in place on the surfaces of the stratification. These surfaces dipped to the south 68°. The rock consists of a very hard, gray, slaty sandstone, frequently breaking into irregular cross fractures. The *Trilobite* found here is of great interest. It belongs to the genus *Paradoxides*, and is no doubt the same as described by Prof. Green many years since, under the name of *P. Harlani*, of which there is a cast in the collection of the Academy, and which, on comparison with the specimen now presented, proves to be undoubtedly identical. Barande describes and figures several species of the genus *Paradoxides* from the lower Silurian of Bohemia, which are closely allied to this, and prove conclusively that the strata must be nearly if not precisely on the same horizon.

Dr. Hammond introduced Major Wayne, U. S. A., recently engaged in the effort to domesticate the camel in Texas. Major Wayne said :

It gives me pleasure, Mr. President and Gentlemen of the Academy of Natural Sciences, to comply with the request of my friends, and make a few remarks before you this evening, upon the experiment of introducing the Camel into America. I esteem the opportunity offered fortunate, as I desire to enlist your interests and sympathies in an undertaking possessing scientific interest, and as I believe great practical benefit, prospectively, for our country. I may not be able to add any thing to your Zoological knowledge, but I may inform you of our purposes, and hope to secure the co-operation of a society so influential and progressive as is yours.

There have been previous attempts to introduce the Camel into the Western Hemisphere, into South America, Mexico, the island of Jamaica, and according to Mr. D. J. Browne, of the Patent Office, into our own Virginia in the year 1701. Of these attempts I have not met with any clear account, either as to their origin, progress or failure. To preserve, to Zoological history, therefore, the present effort, I will premise my remarks by a brief sketch of its rise and progress.

Shortly after the close of the war with Mexico, when our territory became extended to the Pacific, the advantage of the uses of the Camel in our great interior continent suggested itself to the mind of Col. Geo. H. Crosman, of the Army, who communicated his views to myself and others. Examination of the subject induced the belief that the animal would be of great use, beyond our present means of transportation, (pack mules or wagons,) in carrying on trade and communication through our own deserts ; and that even if, with the progressive spirit of our country, the iron rail and steed should unite the two oceans, that there would be still to the North and to the South large regions to be developed, and that this most profitably and readily could be accomplished by the powers and endurance of the Camel. We saw Congress voting money freely for this or that scheme for personal or local benefit, and we thought it not unjustifiable to ask for $30,000 for an experiment broadly national in its character, and of which the advantage, if successful, might be said to be incalculable. A bill for the purpose was introduced into Congress by the Hon. Jefferson Davis, of Mississippi, then Chairman of the Military Committee, who entered warmly into the measure, and who subsequently, as Secretary of War, brought it to a successful conclusion. From 1848 to 1855, we struggled with varying fortunes. Our contention was not with men of science. Had it been, no difficulties in the way of an early practical test would have been interposed. But it was with ignorance, prejudice and ridicule. Of the Camel, nothing was known popularly. And its only use patent to our people, was to excite wonder and merriment in our menageries. It is due, however, to the Military Committees of both the Senate and House to say, that they unwaveringly supported the measure throughout. And here let me add another tribute to that just read by your Secretary, to the memory of one whose name and contributions to science are now historical. I mean the late lamented Geo. R. Gliddon. He aided us much by his knowledge of the East, of the Camel itself, of its uses, with which he had been for many years practically acquainted in Egypt, and enabled us to place the matter in the right point of view before Congress and the Press. The experiment owes to his exertions much of its success. Without wearying you with details, suffice it to say, through the management of General Shields, of the Senate, a bill was finally passed in favor of the experiment on the 3d of March, 1855, and soon after I was sent for by the Secretary of War, and charged by him with the responsibility of conducting it.

For my first studies, my attention had been given to Africa; but as I progressed, I found myself carried into Asia, and become satisfied that the animal would be drawn from that country with greater chances of success. Taking up Humboldt's Isothermal Lines, and studying the effects of geological structure and topographical formation upon temperature, I carried into America a system

of Isotherms, corresponding as nearly as I could trace them, with those of Asia, and was led to believe that in Texas, somewhere, I should meet with climates similar to many of those in Asia, in which the Camel lived; and by the time the bill was passed, and indeed for two years before it, I was prepared with a digested plan, which I am happy to say was carried out without change, and so far fortunately. Nearly two years' experience with the animal on this continent has given satisfactory proof that it will live, propagate and flourish among us. In connection I would here mention, that within a few days I have heard that a fossil camel bone has been discovered in the West, and is so declared to be by one of your distinguished members, Dr. Leidy. If this be so, I adopt the fact as evidence, further, that the Camel may be domesticated among us.

Desirous of informing myself thoroughly of the difficulties in my way, and that I might be certain of having taken them all in, I visited England and France on my route to the East, for the purpose of discussing the matter there with men of science, and of profiting by their suggestions. In England I was cordially received, especially by Professor Owen, and D. W. Mitchell, Esq., Secretary of the Zoological Society, London, and met everywhere with encouragement. Prof. Owen and Mr. Mitchell expressed themselves confidently as to our success. To these two gentlemen my warmest thanks are due for facilities, encouragement and practical suggestions. In France, I did not meet with the same support. Indeed, my visit was at an unfavorable period. The sympathies of this country, with Russia in the struggle then going on, the vile abuse in certain of the papers of the Emperor and Empress, the fillibustering attempts on Cuba, and our own difference in relation to the Consul at San Francisco pending at the time, created in governmental circles impressions not the most favorable to Americans; and I found so many delays interposed that the prosecution of my researches in that direction (in regard to military experience with the animal in Algeria) were discontinued. The men of science with whom I conversed, spoke doubtingly of the result; indeed, did not think I could transport so many animals, 30 to 40, across the Atlantic, and doubted if those that might be landed would live. With true French idiosyncrasy they examined the question only with regard to Algeria, and did not apparently extend their investigations to the hardier races of Asia. The more I learned, the more convinced was I of the feasibility of the experiment, the only difficulty in the way being the transportation of so many animals across the sea. But on this point I was also sanguine, the Secretary of War having, at my request, committed that portion of the experiment to Lieut. Porter, of the Navy, an officer of ability, ingenuity and experience, and whose complete success fully demonstrated the propriety of the selection.

If my appreciation of the animal from reading only had been such as to induce me to give it so much time, and to risk so much of reputation, you may imagine my estimation of it when landed in the East; I saw it in use, not only sustaining, but exceeding the limits of utility within which I had restricted my expectations and my declarations. It is really a noble animal, and one of the most wonderful adaptations of the Infinite to the wants of his creatures. Provided with water, as you all know, for several days by the peculiar formation of its stomach, and with sustenance in its ungainly hump, strongly built in front for burdens, and with a protuberant eye that ensures its footing; its fitness for deserts andfor an irregular, broken country, deficient in water or herbage, are palpably evident. With regard to the particular physical structure which enables it to carry a supply of water for three or four—even, in some cases, *seven*—days, I have not yet been satisfied. The Camel is a ruminant, and with others of that class has distinctly its four stomachs. The idea of a fifth, as has been adopted by some, I think we must discard. How, then, is the water carried? The best opinion now is, I think, that it *is contained* in the coatings of the first stomach, in a number of small cells, as water is held in the melon. Such is the view of General Carbreccia, who conducted the experiment with camels in the service of the French army in Algeria. And that the Camel, by muscular

action, squeezes out a sufficient quantity to moisten its food at will. Cuvier goes further, and says the Camel has the power of secreting or creating water. How, he does not say, and we are left by his authority to our own speculations. This is one curious point for our attention, and a satisfactory report upon it would be exceedingly interesting to science.

The hump is essentially fatty, and by some, has been thought to be intimately connected with the animal's vitality. But I think this opinion erroneous. I have seen nothing myself to sustain it, and Linant de Bellefonds, known in Egypt, as Linant Bey, the Chief Civil Engineer to the Viceroy, who is particularly fond of Dromedaries, told me that he had in two or three instances opened the hump and cut out portions of the fat without apparently much pain to the animal, and certainly with no material injury to it. As I have before said, it is the animal's reservoir of food. When forage is scant, its gradual absorption sustains life and strength, and it is not until that is totally absorbed, that the muscles and stomach, sa with other animals, are attacked. I have seen Camels coming in from long journeys, with their backs almost straight. In the skeleton in your Museum, there is no rise of the dorsal vertebræ. In those I have anatomized, I have invariably found a slight convexity of the upper line of the vertebræ under the hump, as it were, an arch for its support.

It was with great difficulty that we could satisfy the public mind as to the hoof of the Camel. That it was not soft and tender, but tough, and capable of travelling safely and comfortably over a fair share of stony soil. On this point, Dr. Atkinson and Mr. Farlane bear ample testimony. The former, the Surgeon General of the Cabul Expedition in 1841, I think, without speaking intentionally of the Camel, introduces him in comparison with their other means of transportation; and the Doctor speaks of its peculiar surefootedness, and that its broad, tough and yielding hoof trod securely upon the rolling cobble stones of the mountain torrents, while horses and mules slipping on them, were thrown, often to the loss of animal or load, and sometimes of both. The latter speaks particularly to the point, and says, that in his many journeys in Asia Minor, he never saw a rounded hoof. And when we recollect that almost all the trade of Asia, from the confines of Mongolia to the Mediterranean and Black Seas, and from India to Siberia, is carried through Central Asia, over countries mountainous, rugged and desert, through sand and volcanic debris, and that the animal travels in climates so far north as to range several degrees below zero, for instance—the Mountains of Media, at 25° below of centigrade, equal to 13° below of Fahrenheit, we may be satisfied that the Camel's foot is equal to any surface we shall have to expose it to on this continent, and corrects another popular impression, that the Camel is an animal of the Torrid Zone, and cannot stand cold.

There is one point to which I would especially call the attention of the Society. At my first outset I was confused by the adopted nomenclature of this class of animals established by Buffon. He calls the two-humped animal the "Camel," and the one-humped, the "Dromedary." Now this classification excludes "the Camel" from all the world but a portion of Tartary. Travelling in the East, however, we find the Arabic word "*gimel*," "*djmel*," Hebrew *garmal*, applied to both species as the generic term, and that the word *dromedary* is unknown. Examining further, we find the word *dromedary* to be a derivative from the Greek, (δρομευς) runners or racers, and to have been applied only to the riding or swift species of the one-humped class. For my own satisfaction, and to facilitate the clearness of my researches, I adopted the word *Camel* (Lat. Camelus) as generic, designating the two classes of their nativity. The two-humped I styled the Bactrian Camel, from its ancient home, Bactria, and the single-humped, the Arabian Camel, from the country of its origin in Arabia; reserving the word dromedary as applicable only to the riding animal of the one-humped species. Subsequently, finding these views to be entertained by Gen. E. Dumas, of the French Army, Director of, and long connected with, the affairs of Algeria, and by Linant Bey, of Egypt, I have openly adopted this

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nomenclature and classification in my official Report, and would respectfully submit it to the consideration of the Academy. The two varieties differ as the horse and ass; the product of the two being a hybrid, deficient in power for the continuance of the race, and if producing at all, giving life to a poor, undersized, worthless animal. The cross of the double-humped or Bactrian male upon the single-humped or Arabian female is known as a *Tinlu or Boogdee*, and is the useful animal of the caravan, uniting as it does the strength of its paternity with the quicker movements of its maternal stock. It is classed with the one-humped, though a slight rising in rear of its hump, in many instances hardly discernible, marks its double descent. These animals will lift for short distances from 1,000 to 1,500, even 1,800 pounds, and carry on journeys from 700 to 800, making from 18 to 25 miles, according to the character of the country travelled over. For the creation of this useful cross, double-humped males are kept throughout Asia as stallions are with us. I did not see a cross of a single-humped male on the double-humped female, nor did I gather anything in relation to it.

Collecting my animals principally in Asia Minor, including two Bactrians, a Tinlu or hybrid, and Arabian males and females, with a few burthen camels and dromedaries from Egypt, we started for the United States from Smyrna, on the 15th of February, 1856, and landed the Camels on the shores of Texas on the 14th of May, 1856, after an unusually rough voyage. We sailed from Asia with 33 animals on board, and landed with 34, having lost but one of the original stock embarked, and having had some births on the way. The success of the first importation induced a second; and on the 10th of February, 1857, forty-one more camels out of forty-three embarked were delivered in Texas, making in all 75 safely landed in America.

So far the results have realized our sanguine expectations. But two of the whole lot, the Bactrians, have fallen victims to acclimatory disease. The others seem to be as much at home as on their native soil, and have been used with convincing proof of their usefulness and advantage. Our ordinary means of transportation in our great inland territory are pack mules and wagons. A pack mule cannot carry on a journey, on an average, more than 150 pounds—I speak from experience with them in Mexico,—and requires a daily allowance of water. The Camel carries from 350 to 800 pounds, according to quality, and is independent of water for three or four days. The mule travels from 15 to 20 miles a day; the Camel from 18 to 25. The mule and the Camel consume about the same amount of food. If anything, the Camel can do with less. Once fed, the Camel is fed for 24 hours. Browsing as well as grazing, it picks up food where other animals would not live, and eats readily spinous plants. In the hyperbolic language of the East, the Camel finds sustenance where the eye of man cannot detect herbage. On one occasion I carried, on six Camels, 3,648 pounds, over the same road and distance travelled by wagons, and gained on them 42½ hours in time, the wagons carrying on an average only 1,800 pounds, and drawn by six mules each. This comparison was altogether accidental. Early in this year thirty-five Camels were sent with a party to the Pacific, and I am fortunate in being able to read to the Society the last report from them. Coming, as this testimony does, from a gentleman, Mr. Beale, in no way connected with the experiment of their introduction, I think it may be regarded as impartial. The Camels were attached to Mr. Beale's expedition, under a competent person, Mr. Heap, who had accompanied me on the first expedition, and purchased the animals for the second importation. Mr. Beale writes:—

(Extract.)

"*King's Creek, Sept.* 27, 1857, 100 *miles east of the Colorado.*

Hon. J. B. Floyd, Secretary of War:

Sir—I have the honor to report my arrival at this place, a creek flowing north into the Colorado. * * * * * * *

I cannot sufficiently express my admiration of that noble brute, the Camel; and I look

forward confidently to the day when they will be found in general use in all parts of the country. The idea that their feet would break down in travelling over rocky ground is an exploded absurdity. In all the explorations, over the roughest possible volcanic rock, they have been with us, patiently packing water, of which they never drank a drop, and corn, of which they never tasted a grain. On the expedition, from which I returned yesterday, they were four days without water, and apparently without feeling the want of it. * * * * * * *

(Signed) E. F. Beale."

On one occasion, shortly after landing the first importation, and when carrying them up from the Coast of San Antonio, the Camels broke suddenly from the road and rushed furiously towards one spot a little distance from it. Fearful that something had gone amiss, I was hastening towards them with anxiety, when I was met by one of the Turks, holding out to me a plant, and with a face beaming with pleasure. Through the American interpreter, he informed me that it was a plant of which the Camel was particularly fond, and that they had simultaneously smelt or seen it, and rushed for it. Hence their unusual vehemence. This, as you may suppose, came cheerfully home to me. For if the land bore Camels' food, why not the Camels too? The plant was apparently of the same class as *purslane*, but though I showed some of it to various persons in Texas, I could hear nothing of its name or quality.

I have now, gentlemen, endeavored to entertain you so far with these few desultory remarks, and hope I have succeeded in enlisting your interest. I have already occupied too much of your time, and will therefore close by referring to the official Report of the Secretary, published by the Senate, for any further information in detail that you may require.

Major Wayne further, in reply to a question, stated that the cost of the Camels landed in America, including all expenses, averaged about $105; and that the Camel bore the sea voyage better than any animals he had seen carried at sea. That on this point, they were all agreeably relieved. As soon as the vessel became uneasy, the Camels would lie down of their own accord, and so remain until the gale subsided; and that it was only necessary to secure them from chafing. That from some experience and observation of the transportation of horses and mules during the war with Mexico, he unhesitatingly said that he would rather carry 100 Camels at sea, than ten horses or mules. That one of the Camels presented to him by the Bey of Tunis, was on board nine months without leaving the ship, and that he continued in good health, and was now one of the finest of our Camels.

Dr. Leidy observed, in connection with the interesting remarks of Major Wayne, on the introduction of the Camel into North America, that he had been led by his palæontological researches to believe the experiment would prove a successful one, and he had so stated his impressions in conversation with members of the Academy. The grounds of his opinion were founded upon the following facts and inferences. The Horse existed during the pliocene period in America, in association with the Elephant, Mastodon, Ox, Deer, Bear, Peccary, Megalonyx, Lion, Capybara, Camel, &c. This fauna most probably indicates the temperature of the American continent, as then formed, to be what it is now, or nearly so. Though most of the genera mentioned became extinct in North America, the others abundantly exist, and the subsequent introduction of the Horse has been exceedingly fruitful in its results. As remains of the Camel (*Camelops Kansanus*) have been discovered in Kansas Territory, and a congener, the Lama, still exists in South America, the reasons are favorable to the introduction of the recent Camel in this country.

December 29th, 1857.

Vice-President Bridges in the Chair.

The Committees to whom were referred the following papers, reported in favor of publication, viz:

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